Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A microfluidic device, comprising:

a first generally planar substrate;

a second generally planar substrate;

a microfluidic network, at least a first portion of the microfluidic network being located between the first and second substrates;

a first gas actuator comprising a first chamber, the first chamber being:

operably connected to the microfluidic network, but otherwise sealed, and

located between the first and second substrates;

the first gas actuator being configured to provide a gas pressure sufficient to move first sample material ~~between~~ from a first location to ~~and~~ a second location spaced apart from the first location within ~~locations of~~ the microfluidic network ~~device~~; and

a second gas actuator comprising a second chamber, the second chamber being:

operably connected to the microfluidic network, but otherwise sealed,

located between the first and second substrates, and

spaced apart from the first chamber;

the second gas actuator being configured to provide a gas pressure to move second sample material ~~between~~ from a third location ~~and~~ to a fourth location spaced apart from the third location within ~~locations of~~ the microfluidic network ~~device~~.

2. (Original) The microfluidic device of claim 1, wherein the first location is spaced apart from at least one of the third and fourth locations.

3. (Original) The microfluidic device of claim 1, wherein the first location is spaced apart from both the third and fourth locations.

4. (Currently amended) The microfluidic device of claim [[1]] 3, wherein the second location overlaps at least a portion of the third location, ~~and the second sample material comprises at least a portion of the first sample material~~.

5. (Currently amended) The microfluidic device of claim [[1]] 3, wherein the first location comprises a first sample processing zone configured to receive sample material and prepare processed sample material therefrom ~~and the first sample material comprises processed sample material prepared at the first sample processing zone~~.

6. (Currently amended) The microfluidic device of claim 5, wherein the first sample processing zone includes ~~is~~ an enrichment zone configured to receive sample material comprising a plurality of particles and prepare processed sample material enriched in the particles compared to the sample material ~~and the first processed sample material comprises enriched sample material~~.

7. (Currently amended) The microfluidic device of claim 5, wherein the first sample processing zone includes ~~is~~ a cell lysing zone ~~and the first processed sample material comprises intracellular material~~.

8. (Original) The microfluidic device of claim 5, wherein at least one of the second, third, or fourth locations comprises a detection zone configured to obtain data indicative of the presence of a sample material.

9. (Canceled)

10. (Canceled)

11. (Currently amended) The microfluidic device of claim 3 [[1]], further comprising a valve disposed to isolate the second gas actuator from the first gas actuator.

12. (Currently amended) A microfluidic device ~~for processing a microdroplet of sample~~, comprising:

a first generally planar substrate;

a second generally planar substrate;

a microfluidic network, at least a first portion of the microfluidic network being located between the first and second substrates;

a first gas actuator comprising a first chamber located between the first and second substrates, the first gas actuator configured to provide a gas pressure sufficient to move sample material ~~the microdroplet~~ from a ~~between~~ first location to a ~~and~~ second location spaced apart from the first location within ~~processing zones of~~ the microfluidic network ~~device~~; ~~and~~

a second gas actuator comprising a second chamber located between the first and second substrates and spaced apart from the first chamber, the second gas actuator configured to provide a gas pressure to move sample material ~~the microdroplet between~~ from the second location ~~processing zone and~~ to a third location ~~processing zone~~ of the microfluidic network, the third location being spaced apart from the first and second locations ~~device~~;

a vent connected to the microfluidic network between the first and second locations and configured to dissipate the gas pressure provided by the first gas actuator, and

a hydrophobic material configured to prevent sample material from exiting the microfluidic network by the vent.

13. (Canceled)

14. (Currently amended) The microfluidic device of claim 12 ~~13~~, wherein the microfluidic network further comprises ~~comprising~~ a valve located between the first and second chambers and configured to isolate the second gas actuator from the first gas actuator.

15. (Currently amended) The microfluidic device of claim 12, wherein the first location ~~processing zone~~ includes ~~is~~ an enrichment zone configured to receive a sample comprising a plurality of particles and prepare an enriched particle sample enriched in particles compared to the sample ~~and the microdroplet comprises an enriched amount of cells~~.

16. (Currently amended) The microfluidic device of claim 12, wherein the second location includes ~~processing zone is~~ a lysing zone ~~and the microdroplet comprises intracellular material released from cells of the first microdroplet~~.

17. (Currently amended) The microfluidic device of claim 12, wherein the third location includes ~~processing zone is~~ a detection zone configured to obtain data indicative of the presence of a sample substance present in the microdroplet.

18. (Currently amended) The microfluidic device of claim 12 ~~17~~, wherein:

the first chamber is operably connected to the microfluidic network but is otherwise sealed,

the second chamber is operably connected to the microfluidic network but is otherwise sealed ~~the sample substances comprise polynucleotides~~.

19. (Currently amended) The microfluidic device of claim 12, wherein the device further comprises:

a third gas actuator comprising a third chamber located between the first and second substrates and spaced apart from the first and second chambers, the third gas actuator configured to provide a gas pressure to move reagent material from the third location to a fourth location within the microfluidic network

~~a substrate and the first, second, and third locations and the first and second gas actuators are integral with the substrate~~.

20. (Currently amended) A method for moving a microdroplet of liquid ~~sample material~~ within a microfluidic device, comprising:

providing~~, at a first location of the microfluidic device,~~ a first increased gas pressure to ~~sufficient~~ move the microdroplet ~~between~~ from a first location to a ~~and~~ second location within ~~processing zones of~~ the microfluidic device; ~~and~~

venting gas from upstream of the microdroplet to stop the microdroplet; and

providing~~, at a second, different location of the microfluidic device,~~ a second increased gas pressure to move at least some of the microdroplet ~~between~~ from the second location to ~~processing zone and~~ a third location within ~~processing zone of~~ the microfluidic device, wherein:

providing a first increased gas pressure comprises heating a volume of gas within a first chamber of the microfluidic device; and

providing a second increased gas pressure comprising heating a volume of gas within a second, different chamber of the microfluidic device.

21. (Currently amended) The method of claim 20, wherein:

providing a first increased gas pressure comprises actuating a heat source in thermal contact with a substrate, the substrate comprising the first and second chambers, and

providing a second increased gas pressure comprises actuating a heat source in thermal contact with the substrate.

~~the microfluidic device comprises a substrate and the first and second gas pressures are provided by gas actuators that are integral with the substrate~~.

22. (Currently amended) The method of claim 20, further comprising actuating a valve to isolate the second location ~~processing zone~~ from the first location ~~processing zone~~ after providing the first gas increased pressure and before providing the second increased gas pressure.

23. (Currently amended) A method for moving a microdroplet of sample material within a microfluidic device, comprising:

providing, at a first location of the microfluidic device, a first gas pressure ~~sufficient~~ to move the microdroplet from a first microdroplet position within the microfluidic device to a second microdroplet position within the microfluidic device, the microdroplet having an upstream interface and a downstream interface;

stopping the microdroplet at the second microdroplet position by venting gas from within the microfluidic device upstream of the upstream interface of the microdroplet; and

providing, at [[a]] the second microdroplet position ~~location~~ of the microfluidic device, a second gas pressure to move at least a portion of the microdroplet from the second microdroplet position to a third microdroplet position within the microfluidic device.

24. (Currently amended) The method of claim 23, wherein:

providing, at a first location, comprises heating a first volume of gas present in a first chamber of a substrate; and

providing, at a second location, comprises heating a second volume of gas present in a second, different chamber of the substrate. ~~the microfluidic device comprises a substrate and the first and second gas pressures are provided by gas actuators that are integral with the substrate.~~

25. (Original) The method of claim 22, further comprising actuating a valve to isolate the second microdroplet position from the first microdroplet position.

26-28. (canceled)

29. (New) A method, comprising:

moving a first volume of liquid within a microfluidic network of a microfluidic device;

stopping the first volume of liquid within the microfluidic network; and

after stopping the first volume of liquid, moving a second volume of liquid within the microfluidic network;

wherein:

moving the first volume of liquid comprises:

increasing a gas pressure upstream of the first volume of liquid, and

positioning an upstream gas liquid interface of the first volume of liquid adjacent a vent of the microfluidic network;

stopping the first volume of liquid comprises:

venting the increased gas pressure upstream of the gas liquid interface of the first volume of liquid from the vent; and

moving the second volume of liquid comprises:

applying a gas pressure to a medial portion of the first volume of liquid to separate the second volume of liquid from the first volume of liquid.

30. (New) A microfluidic system comprising:

the microfluidic device of claim 1;

a first heat source configured to heat the first chamber;

a second heat source configured to heat the second chamber; and

a processor configured to operate the heat sources.

31. (New) A microfluidic system comprising:

the microfluidic device of claim 12;

a first heat source configured to heat the first chamber;

a second heat source configured to heat the second chamber; and

a processor configured to operate the heat sources.